REMARKS

In the Office Action, claims 1-27 were rejected. In response to the office action, Applicant has amended claims 1, 5-6, 14, 18-19, 24, 25 and 27 and cancelled claim 9. Applicant also amended claims 1, 5-6, 14, 18-19 and 25 to incorporate corrections required in light of the informalities cited by the Examiner. Applicant thanks the Examiner for informing the Applicant of the same. No new matter has been added. Upon entry of the amendments, claims 1-8 and 10-27 will remain pending in the present patent application. Reconsideration and allowance of all pending claims are requested.

Rejections Under 35 U.S.C. § 102

Claims 1-27 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,426,988 B2 (hereinafter "Yamada"). Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration.

Claims 1-13

Independent claim 1 was rejected as anticipated by Yamada. Claim 1 recites a method for reducing artifacts in image data generated by a computed tomography system, the artifacts being due to the presence of a high-density object in a subject of interest. According to claim 1 measured sinogram data is received from the computed tomography system. The sinogram data is representative of a plurality of sinogram elements. The method further comprises reconstructing the measured sinogram data to generate initial reconstructed image data and generating corrected sinogram data using the measured sinogram data. Then, the method comprises iteratively reconstructing the corrected sinogram data to generate improved reconstructed image data based on a weight measure associated with each sinogram element. The weight measure is derived from the measured sinogram data.

The Examiner indicated that similar steps were present in Yamada. However, Yamada does not anticipate the method of claim 1 for at least the reasons set forth below.

Claim 1 has been amended by this response. The amendment adds that the corrected sinogram data is iteratively reconstructed to generate improved reconstructed image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived from the measured sinogram data. At least these recitations are not taught by Yamada.

Yamada discloses an image processing method for obtaining a fault image by reconstructing image data obtained by an X-ray CT system. The method comprises obtaining measured projection data, and reconstructing an initial image. An estimated image is set with a predetermined value, and a high-absorber area is set based on the initial image. Estimated projection data is then derived as is a comparison reference image, and a weighted comparison reference image. The estimated image is overwritten by the weighted comparison reference image. The measured sinogram data is then replaced at a portion where the X-rays pass through the high-absorber area with data according to the overwritten estimated projection data to correct the measured projection data. Finally, an image of the corrected measured projection data is reconstructed to derive the fault image.

The Examiner contended that Yamada discloses assigning a weight measure to each sinogram element in the corrected sinogram data, wherein the weight measure is derived based on the measured sinogram data. Applicant points out that the reference does not disclose that the weight measure is derived from the measured sinogram data as contended by the Examiner. Further, Applicant points out that the passage referred to by the Examiner (column 14, line 65 – column 15, line 18), if relevant to a weight measure at all, only indicates that the weighting of the comparison reference image is based on the length of the path through which X-rays pass in the high-absorber region. Specifically, at column 14, line 65 – column 15, line 18, Yamada states:

> According to a length of the path through which X-ray passes in the high-absorber, weighting of the comparison reference image d 0 is carried out to derive a weighted comparison reference image e 0. When the weighting of the comparison reference image d 0 is carried out, the comparison reference image d 0 read out from the comparison reference image memory portion 23 is weighted by the weighting operation portion 15. The weighted comparison reference image e 0 is written in the comparison reference image memory portion 23. The derivation of the weighted comparison reference image e 0 corresponds to a weighted comparison reference image derivation process of the present invention. Next, derivation of the weighted comparison reference image e 0 is explained together with the weighted ART/EM method.
>
> In order to carry out weighting for an artifact portion, a weight function W(L) is introduced as shown in FIG. 7 (b). The weight function W(L) is a function with respect to a length L of a path through which X-ray passes in the high-absorber. The relationship between a position of the path and a weight is shown in FIG. 7(a).

Moreover, Yamada does not teach that any iterative correction of the projection data, if performed, is based on a weight measure derived from the measured sinogram data. Specifically, at column 18, lines 6 – 11, Yamada states:

> Or, the corrected projection data F(P 2) may be again subjected to the reconstruction process by the weighted ART/EM method at the comparison reference image operating portion 14 , weighing operation portion 15 and the fault image overwriting portion 16 to derive the corrected image P 3 which is finally obtained.

Clearly, the above passage indicates that any iterative correction of the projection data, if performed, is based on subjecting the corrected projection data to the reconstruction process at the comparison reference image operating portion, the weighing operation portion and the fault image overwriting portion to obtain the final corrected image. In other words, each iteration of the reconstruction process in Yamada uses the weight measure obtained at the weighted comparison reference image step as a basis to derive the subsequent weight measure to be used in the next iteration. Therefore, the weight measure used in the reconstruction process evolves with each iteration of the

reconstruction process. In accordance with claim 1, the weight measure associated with each sinogram element is based on a weight measure that is derived from the *measured sinogram data* itself.

Because Yamada does not disclose at least that the corrected sinogram data is iteratively reconstructed to generate improved reconstructed image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived from the measured sinogram data, the reference cannot anticipate claim 1. Accordingly, Yamada cannot support a *prima facie* case of anticipation of claim 1. Claim 1 and the claims depending therefrom are therefore believed to be clearly patentable over Yamada as well as other prior art of record.

Claims 14-23

Independent claim 14 was similarly rejected as anticipated by Yamada. Claim 14 recites a method for reducing artifacts in image data generated by a computed tomography system. The artifacts are due to the presence of a high density object in a subject of interest. The method comprises receiving measured sinogram data from the computed tomography system. The sinogram data is representative of a plurality of sinogram elements. The method further comprises reconstructing the measured sinogram data to generate initial reconstructed image data and generating corrected sinogram data using the measured sinogram data. Then, the method comprises assigning a weight measure to each sinogram element in the corrected sinogram data, wherein the weight measure is derived based on the measured sinogram data. Finally, the method comprises iteratively reconstructing the corrected sinogram data to generate improved reconstructed image data based on the weight measure.

As discussed with respect to claim 1 above, Yamada does not disclose that the corrected sinogram data is iteratively reconstructed to generate improved reconstructed

image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived from the measured sinogram data.

Because Yamada does not disclose at least that the corrected sinogram data is iteratively reconstructed to generate improved reconstructed image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived based on the measured sinogram data, the reference cannot anticipate claim 14. Accordingly, Yamada cannot support a *prima facie* case of anticipation of claim 14. Claim 14 and the claims depending therefrom are therefore believed to be clearly patentable over Yamada as well as other prior art of record.

Claims 24 and 27

Independent claims 24 and 27 were similarly rejected as anticipated by Yamada. Claims 24 and 27 recite a computed tomography system for reducing artifacts in image data. The artifacts are due to the presence of a high density object in a subject of interest. The system comprises an X-ray source configured to project an X-ray beam from a plurality of positions through the subject of interest and a detector configured to produce a plurality of electrical signals corresponding to the X-ray beam. The system further comprises a processor configured to process the electrical signals to generate measured sinogram data. The sinogram data is representative of a plurality of sinogram elements. The processor is further configured to reconstruct the measured sinogram data to generate initial reconstructed image data, generate corrected sinogram data using the measured sinogram data and iteratively reconstruct the corrected sinogram data to generate an improved reconstructed image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived from the measured sinogram data.

The Examiner indicated that a similar processor was present in Yamada. However, Yamada does not anticipate the system of claims 24 and 27 for at least the reasons set forth below.

Claims 24 and 27 have been amended by this response. The amendment adds that the corrected sinogram data is iteratively reconstructed to generate improved reconstructed image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived from the measured sinogram data. As discussed with respect to claim 1 above, Yamada does not disclose this aspect.

Because Yamada does not disclose at least a processor that is configured to iteratively reconstruct the corrected sinogram data to generate improved reconstructed image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived from the measured sinogram data, the reference cannot anticipate claims 24 and 27. Accordingly, Yamada cannot support a *prima facie* case of anticipation of claims 24 and 27.

Claims 25 and 26

Independent claims 25 and 26 were similarly rejected as anticipated by Yamada. Claims 25 and 26 are essentially similar to method claims 1 and 14 respectively, except that they recite a computer-readable medium with code for carrying out such functionality.

Claim 25 has been amended by this response. The amendment adds that the corrected sinogram data is iteratively reconstructed to generate improved reconstructed image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived from the measured sinogram data. As discussed with respect to claim 1 above, Yamada does not disclose this aspect.

Because Yamada does not disclose at least that the corrected sinogram data is iteratively reconstructed to generate improved reconstructed image data based on a weight measure associated with each sinogram element, wherein the weight measure is derived from the measured sinogram data, the reference cannot anticipate claims 25 and 26.

Accordingly, Yamada cannot support a *prima facie* case of anticipation of claims 25 and 26.

Conclusion

In view of the remarks and amendments set forth above, Applicant respectfully requests allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Date: 3/22/05

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